

A NEW SMUT IN A NEW GENUS OF GRASS.

BY D. McALPINE, Corresponding Member.

(Plate i.).

A grass was sent to me, in November, by Professor Ewart, which he determined to be a new genus, *Sarga*; and the ovaries were black and swollen, evidently owing to a smut. They contained a black powdery mass which stained the fingers, but without smell; and, on examination, this powder was found to be the spores of a smut. The specimen was from North-West Australia; and, in a recently published work on 'The Smuts of Australia,' it is remarked "In West Australia only those species are known, which attack cultivated crops, and those occurring on the native flora have yet to be discovered." There is no doubt but a rich harvest awaits the smut-collector in West Australia, and the present new species is the first of its kind.

USTILAGO EWARTI McAlp.

Sori in spikelets, forming a black compact mass, much swollen, at first enveloped by the firm wall of the ovary, ultimately bursting and allowing the black powdery spores to escape. Spores black in the mass, dark brown individually, globose, averaging 10-13 μ diam., occasionally ellipsoid (13 \times 11 μ), densely covered with pointed spikes

Germination as in *Ustilago*.

Hab. North-West Australia: Napier, Broome Bay; May, 1910 (Ewart).

On the one-flowered, hermaphrodite spikelets of *Sarga stipoides* Ewart and White.

The basal portion of the long and twisted, persistent awn remains attached for some time to the smutted ovary.

If a transverse section of a smutted grain is made, the interior is seen to be filled with spores at different stages of maturity, intermixed with slender colourless fungus-filaments rounding off

into spores at intervals or close together. The spores are at first small, ellipsoid becoming round, colourless, smooth and thick-walled. Then of an olivaceous tint, passing into a golden-brown, with echinulate wall, and finally of a deep rich brown, with wall densely spiked.

Germination.—This took place in a hanging drop of tap-water, where a large proportion of the spores germinated, and the photographs were taken after five days. The germinal tube or promycelium varies considerably in length, and is divided into numerous segments, which are sometimes constricted at the septa, and at first densely vacuolated.

Numerous fusiform, colourless conidia are given off laterally and terminally, in chains of three or more, and each conidium is $3\text{--}6\ \mu$ long.

The new genus of grass belongs to the group *Agrostideae*, and there is a smut on *Amphipogon*, from South Australia, named *U. tepperi* Ludw., which somewhat approaches this one, but the aculeate spores are larger, and the sori are in the stems, as well as in the flowers. Altogether it is a distinct species, from the mode of germination, the relative size of the spore, and its dense echinulation.

It is named in honour of the Professor of Botany, at Melbourne University, and Government Botanist for Victoria; and this is peculiarly appropriate, since it is the first smut recorded on a native grass belonging to West Australia, and which has been determined by Professor Ewart as a new genus.

EXPLANATION OF PLATE.

Plate i.

Ustilago ewarti McAlp.

Fig.1.—Smutted panicles of *Sarga stipoides* Ewart and White, with healthy grain at side; (nat. size).

Fig.2.—Spores densely covered with spikes; ($\times 500$).

Figs.3-4.—Spores germinating, and producing more or less slender septate promycelia, with lateral and terminal conidia in chains; ($\times 500$).